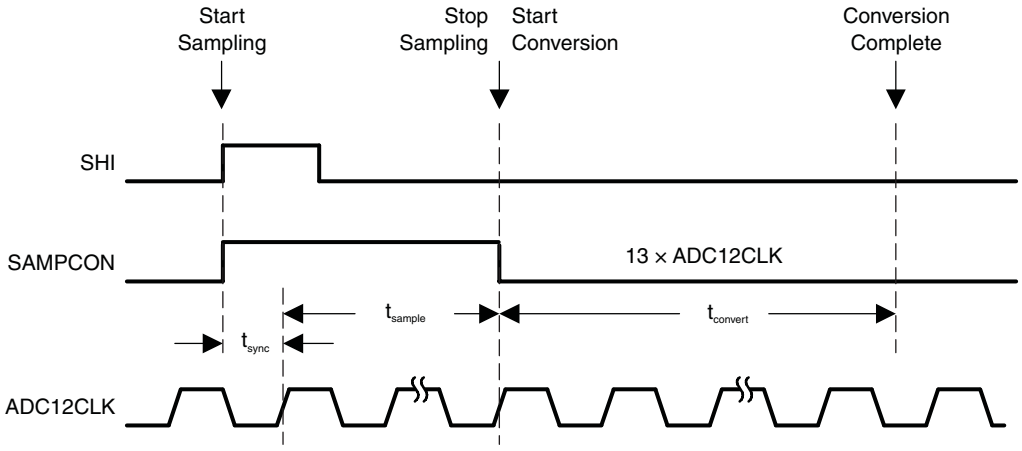

Figure 17-4. Pulse Sample Mode

17.2.5.3 Sample Timing Considerations

When SAMPCON = 0, all Ax inputs are high impedance. When SAMPCON = 1, the selected Ax input can be modeled as an RC low-pass filter during the sampling time t_{sample} (see Figure 17-5). An internal MUX-on input resistance R_I (maximum 1.8 kΩ) in series with capacitor C_I (25 pF maximum) is seen by the source. The capacitor C_I voltage V_C must be charged to within one-half LSB of the source voltage V_S for an accurate n-bit conversion, where n is the bits of resolution required.

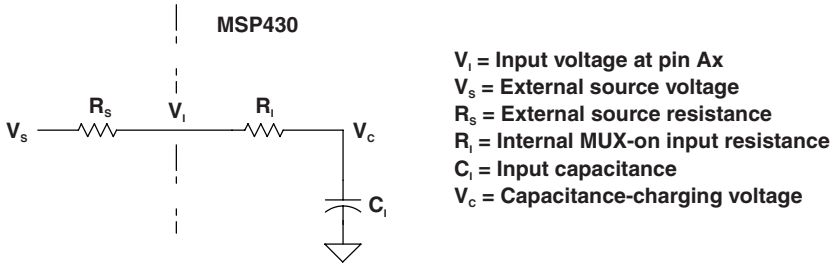

Figure 17-5. Analog Input Equivalent Circuit

The resistance of the source R_S and R_I affect t_{sample}. The following equation can be used to calculate the minimum sampling time t_{sample} for a n-bit conversion, where n equals the bits of resolution:

$$t_{sample} > (R_S + R_I) \times \ln(2^{n+1}) \times C_I + 800 \text{ ns}$$

Substituting the values for R_I and C_I given above, the equation becomes:

$$t_{sample} > (R_S + 1.8 \text{ k}\Omega) \times \ln(2^{n+1}) \times 25 \text{ pF} + 800 \text{ ns}$$

For example, for 12-bit resolution, if R_S is 10 kΩ, t_{sample} must be greater than 3.46 μs.

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